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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/643,946	08/23/2000	Kevin J. Torek	M4065.0166/P166-A	2940

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EXAMINER

VINH, LAN

ART UNIT	PAPER NUMBER
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1765

DATE MAILED: 07/16/2002

13

Please find below and/or attached an Office communication concerning this application or proceeding.

## Office Action Summary

Application No.

09/643,946

Applicant(s)

TOREK ET AL.

Examiner

LAN VINH

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 16 May 2002.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 142-160 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 142-160 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on \_\_\_\_\_ is: a) ☐ approved b) ☐ disapproved by the Examiner.  
If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

### Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).  
a) ☐ All b) ☐ Some \* c) ☐ None of:  
1. ☐ Certified copies of the priority documents have been received.  
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.  
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).  
\* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).  
a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

### Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) \_\_\_\_\_
- 4) ☐ Interview Summary (PTO-413) Paper No(s) \_\_\_\_\_
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_

## **DETAILED ACTION**

### ***Claim Rejections - 35 USC § 112***

1. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

2. Claims 142, 150, 158 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

In lines 8-10 of claim 142 and claim 150, lines 5-8 of claim 158, the language of "and configured to minimize the removal of metal lines from exposed surfaces of said semiconductor substrate while said residues are being removed from said semiconductor substrate" is vague and indefinite because the term "configured to minimize" has not been defined in the specification. There is no guideline in the claims of how to configure ( i.e. by changing the concentration ) the conditioning solution to minimize the removal of the metal lines. Thus the vague and indefinite term "configured to minimize" renders the passage " and configured to ..... semiconductor substrate" vague and indefinite.

### ***Claim Rejections - 35 USC § 103***

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

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4. Claims 142, 150 are rejected under 35 U.S.C. 103(a) as being unpatentable over Schellenberger et al. ( US 5,714,203 ) in view of Ward et al ( US 5,988,186 )

Schellenberger discloses a method for drying semiconductor substrate including the step of dipping the substrate in a cleaning solution. This solution comprises of:

hydrofluoric acid (HF) ( col 3, lines 55-56 )

acids such as hydrochloric acid (HCl), phosphoric acid ( $H_3PO_4$ ) ( col 3, lines 58-59 )

alcohol ( col 3, lines 56-57 )

citric acid ( col 3, lines 57-58 ) reads on citric acid acting as a surface passivation agent especially since citric acid is of the same chemical element as the claimed surface passivation agent as defined in page 10 of the specification.

Since, Schellenberger' s cleaning solution contains up to 80 % of alcohol ( a known non-aqueous solvent, see prior art of record for evidence of this basis ) ( col 3, lines 63-64 ), it reads on a substantially non-aqueous solution because the claimed substantially non-aqueous solution as defined as a solution that has approximately 80-95% of alcohol in page 10 of the specification.

Unlike the instant claimed inventions as per claims 142,150, Schellenberger does not specifically disclose using propylene glycol ( a known non-aqueous solvent/ alcohol ) in the cleaning solution although Schellenberger does discloses using alcohol in the cleaning solution.

However, Ward discloses an acidic semiconductor cleaning solution containing alcohol such as propylene glycol ( col 4, lines 40-42 )

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Therefore, one skilled in the art would have found it obvious to modify Schellenberger 's cleaning solution by using propylene glycol in the solution in view of Ward teaching because Schellenberger suggests that alcohol can be used in the cleaning solution and Ward teaches that solvent/alcohol which can be used in the semiconductor cleaning solution include and not limit to polyhydric alcohol such as propylene glycol ( col 4, lines 40-42 )

For the purpose of examination, the language of " said conditioning solution is configured to minimize", as best understood by the examiner, implies that the claimed conditioning solution is substantially non-aqueous and made of the claimed chemicals ( HF acid, phosphoric acid, citric acid and propylene glycol ). Since Schellenberger as modified by Ward discloses using a substantially non-aqueous cleaning solution contains the same claimed chemicals (HF acid, phosphoric acid, citric acid and propylene glycol ) as the claimed conditioning solution to clean metal surface of contaminations ( col 2, lines 27-30 ), it is inherent that Schellenberger's modified cleaning solution is configured to minimize the removal of metal lines from exposed surfaces of said semiconductor substrate while said residues are being removed from said semiconductor substrate.

In addition, the examiner notes that the language of " and configured to minimize the removal of metal lines from exposed surfaces of said semiconductor substrate while said residues are being removed from said semiconductor substrate" is a recitation of the intended use of the claimed invention. A recitation of the intended use of the claimed invention must result in a structural difference between the claimed invention

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and the prior art in order to patentably distinguish the claimed invention from the prior art. If the prior art structure/composition is capable of performing the intended use, then it meets the claim. In a claim drawn to a process of making, the intended use must result in a manipulative difference as compared to the prior art. See *In re Casey*, 152 USPQ 235 (CCPA 1967) and *In re Otto*, 136 USPQ 458, 459 (CCPA 1963).

5. Claims 143, 151, 158-160 are rejected under 35 U.S.C. 103(a) as being unpatentable over Schellenberger et al. ( US 5,714,203 ) in view of Ward et al ( US 5,988,186 ) and further in view of Verhaverbeke et al (US 6,261,845 )

Schellenberger as modified by Ward has been described above in paragraph 4. Schellenberger and Ward cleaning solution differs from the claimed cleaning solution as per claims 143, 151 and 158 by having additives such as surfactant, solid additive whereas the claimed cleaning solution consisting essentially of :HF, phosphoric acid/hydrochloric acid, alcohol/propylene glycol and citric acid.

However, Verhaerbeke, in a method and system for determining chemical concentration of semiconductor cleaning solution, teaches that the concentrations of the chemicals in the wet processing stream/cleaning liquid, degree of cleaning are variables that can be calculated ( col 8, lines 33-35 )

Since Schellenberger already discloses using 0-50 wt% of acids, 0-80 wt% of alcohol, 0-5 wt% of surfactant and 0-50 wt % of solid additive ( col 3, lines 63-65 ) in the cleaning solution, one skilled in the art would have found it obvious to adjust/calculate the concentration of the components in Schellenberger's cleaning

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solution in view of Verhaerbeke's teaching using routine experimentation to achieve a cleaning solution consisting essentially of :HF, phosphoric acid, alcohol/propylene glycol and citric acid.

The limitations of claims 159-160 have been discussed above in paragraph 4.

6. Claims 144-149, 152-157 are rejected under 35 U.S.C. 103(a) as being unpatentable over Schellenberger et al. ( US 5,714,203 ) in view of Ward et al ( US 5,988,186 ) and further in view of Verhaerbeke et al (US 6,261,845 )

Schellenberger as modified by Ward has been described above in paragraph 4.

Unlike the claimed inventions as per claims 144-149, 152-157, Schellenberger and Ward fail to disclose the specific proportion/concentration of the components in the cleaning solution although Schellenberger does disclose the adjustable concentration ranges of the components as described above.

However, Verhaerbeke, in a method and system for determining chemical concentration of semiconductor cleaning solution, teaches that the concentrations of the chemicals in the wet processing stream/cleaning liquid, degree of cleaning are variables that can be calculated ( col 8, lines 33-35 )

Hence, one skilled in the art would have found it obvious to adjust/calculate the concentration/variable of the components in Schellenberger and Ward cleaning solution in view of Verhaerbeke's teaching using routine experimentation to discover the optimum or workable ranges.

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7. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Woo et al ( US 5,698,041 ) discloses that propylene glycol is a non-aqueous solvent ( col 9, lines 18-20 )

Jagannathan et al. ( US 5,304,284 ) discloses that alcohols are non-aqueous solvents ( col 5, lines 46-48 )

### ***Response to Arguments***

8. Applicant's arguments with respect to claims 142-160 ( filed on 4/16/2002 ) have been considered but are moot in view of the new ground(s) of rejection.



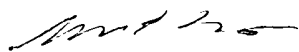
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**Conclusion**

9. Any inquiry concerning this communication or earlier communications from the examiner should be directed to LAN VINH whose telephone number is 703 305-6302. The examiner can normally be reached on Monday-Friday 8:30 -6:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, BENJAMIN L UTECH can be reached on 703 308-3836. The fax phone numbers for the organization where this application or proceeding is assigned are 703 872-9310 for regular communications and 703 872-9311 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703 308-0661.

  
**BENJAMIN L. UTECH**  
**SUPERVISORY PATENT EXAMINER**  
**TECHNOLOGY CENTER 1700**

LV  
July 8, 2002